

JPRS 68901

8 April 1977

TRANSLATIONS ON EASTERN EUROPE  
SCIENTIFIC AFFAIRS  
No. 541

DISTRIBUTION STATEMENT A  
Approved for Public Release  
Distribution Unlimited

20000302 118

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U. S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA. 22161

Reproduced From  
Best Available Copy

#### NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

#### PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22151. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

<b>BIBLIOGRAPHIC DATA SHEET</b>	1. Report No. JPRS 68901	2.	3. Recipient's Accession No.																		
4. Title and Subtitle TRANSLATIONS ON EASTERN EUROPE - SCIENTIFIC AFFAIRS, No. 541		5. Report Date 8 April 1977																			
7. Author(s)		6.																			
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201		8. Performing Organization Rept. No.																			
		10. Project/Task/Work Unit No.																			
		11. Contract/Grant No.																			
12. Sponsoring Organization Name and Address As above		13. Type of Report & Period Covered																			
		14.																			
15. Supplementary Notes																					
16. Abstracts  The serial report contains articles concerning the development of and progress in the various theoretical and applied scientific disciplines and technical fields; and the administration, structure, personnel, and research plans of leading East European scientific organizations and institutions, particularly the academies of sciences.																					
17. Key Words and Document Analysis. 17a. Descriptors  <table border="0"> <tr> <td><input checked="" type="checkbox"/> International Affairs</td> <td>Scientific Societies</td> </tr> <tr> <td><input type="checkbox"/> Albania</td> <td>Research Management</td> </tr> <tr> <td><input checked="" type="checkbox"/> Bulgaria</td> <td>Organizations</td> </tr> <tr> <td><input type="checkbox"/> Czechoslovakia</td> <td>Research</td> </tr> <tr> <td><input checked="" type="checkbox"/> East Germany</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> Hungary</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Poland</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Romania</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Yugoslavia</td> <td></td> </tr> </table>				<input checked="" type="checkbox"/> International Affairs	Scientific Societies	<input type="checkbox"/> Albania	Research Management	<input checked="" type="checkbox"/> Bulgaria	Organizations	<input type="checkbox"/> Czechoslovakia	Research	<input checked="" type="checkbox"/> East Germany		<input checked="" type="checkbox"/> Hungary		<input type="checkbox"/> Poland		<input type="checkbox"/> Romania		<input type="checkbox"/> Yugoslavia	
<input checked="" type="checkbox"/> International Affairs	Scientific Societies																				
<input type="checkbox"/> Albania	Research Management																				
<input checked="" type="checkbox"/> Bulgaria	Organizations																				
<input type="checkbox"/> Czechoslovakia	Research																				
<input checked="" type="checkbox"/> East Germany																					
<input checked="" type="checkbox"/> Hungary																					
<input type="checkbox"/> Poland																					
<input type="checkbox"/> Romania																					
<input type="checkbox"/> Yugoslavia																					
17b. Identifiers: Open-Ended Terms																					
17c. COSATI Field/Group 5B																					
18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 51																		
		20. Security Class (This Page) UNCLASSIFIED	22. Price A04																		

8 April 1977

TRANSLATIONS ON EASTERN EUROPE  
SCIENTIFIC AFFAIRS

No. 541

## CONTENTS

PAGE

## INTERNATIONAL AFFAIRS

- Probability of Earthquakes in Balkans Studied  
(Constantin Radu Interview; STIINTA SI TEHNICA, Dec 76) 1

## BULGARIA

- Suggestopedic Educational System Applied in Experimental  
Schools  
(Georgi Lozanov; PROBLEMI NA KOMUNISTICHESKOTO  
VUZPITANIE, No 12, 1976) ..... 5
- Psychophysiological Aspects of Suggestopedic Educational  
System  
(Petur Balevski; PROBLEMI NA KOMUNISTICHESKOTO  
VUZPITANIE, No 12, 1976) ..... 16
- Psychohygienic Aspects of Teacher-Student System  
(Dimitrina Kolarova; PROBLEMI NA KOMUNISTICHESKOTO  
VUZPITANIE, No 12, 1976) ..... 21
- Suggestology, Means for Mass Information, Propaganda  
(Lyubomir Ganovski; PROBLEMI NA KOMUNISTICHESKOTO  
VUZPITANIE, No 12, 1976) ..... 26
- Effects of Extracurricular Activities on Sociopsychological  
Aspect of Students  
(Georgi Angushev; PROBLEMI NA KOMUNISTICHESKOTO  
VUZPITANIE, No 12, 1976) ..... 31

## EAST GERMANY

- New Microcomputers From Robotron Described  
(E. Hofmann; DIE TECHNIK, Mar 77) ..... 37

CONTENTS (Continued)

Page

HUNGARY

Use of and Demand for Microprocessors Analyzed, Comment  
on Microprocessors

(M. Kovacs, J. Saufert; HIRADASTECHNIKA, Jan 77) ..... 42

## INTERNATIONAL AFFAIRS

### PROBABILITY OF EARTHQUAKES IN BALKANS STUDIED

Bucharest STIINTA SI TEHNICA in Romanian No 12, Dec 76 pp 18, 19

[Interview with Dr Constantin Radu, by Constantin Nedelcu]

[Text] Between November 1970 and July 1976, UNESCO and UNDP conducted a study of earthquakes in the Balkans, a program which had the participation of five countries (Romania, Yugoslavia, Bulgaria, Greece, and Turkey). In addition to these, and although not an official participant, Albania furnished the materials needed for the study (list of earthquakes, seismic and tectonic maps, earthquake mechanisms, and so on).

The program, financed by the participating countries and by UNDP, had three principal objectives: collecting and analyzing the information available about earthquakes in the area, establishing a map of seismic risks, improving the network of seismologic observatories, and improving the earthquake resistance of buildings.

Romania was represented by its specialists (Prof Liviu Constantinescu, member of the Coordinating Commission, Dr I. Cornea, Dr C. Radu, Lecturer V. Lazarescu, Eng N. Mandrescu, and Eng G. Serbanescu) at all the meetings and conferences organized as part of the program. Some of the international experts were N. V. Shebalin and G. P. Gorshov (USSR), and S. T. Algermissen and C. R. Allen (USA). The program was managed by V. Karnik (Czechoslovakia), and during the last period (November 1975-May 1976) by Dr C. Radu, who was kind enough to talk to us about some of their findings.

Using the materials supplied by the participating countries, the UNESCO experts together with local specialists completed some very important projects. One of these is a "Catalog of Earthquakes in the Balkan Region" (part I for 1901-1970, earthquakes with a magnitude greater than or equal to 4 degrees on the Richter scale, or with an intensity  $I_0 \geq VI$ ; and part II, which includes earthquakes with  $I_0 \geq VII$  for 1801-1900, and earthquakes with  $I_0 \geq VIII$  for the period before 1800). An appendix to the catalog is the "Atlas of Isoismic Maps" for the stronger earthquakes. In 1973, the paper

"Studies and Investigations of Seismotectonics in the Balkans" was written in Dubrovnik, and other comprehensive studies -- tectonic, geologic, seismic, and of recent crust movements -- have been used to draw the "Seismotectonic Maps of the Balkans," which delineate potential seismic zones.

A study of the mechanisms involved in the 474 earthquakes which have occurred in the Balkans between 1928 and 1973, has led to the writing of "Study of Earthquake Mechanisms"; the information included in this work provides a complete image of the tectonic tensions in the zone. The studies of seismic risk and zoning were also presented at two conferences, one held in Bucharest in May 1974, and the other in Skopje in April 1975. That is where the experts and specialists presented the results of their research in seismic zoning, recurrence periods for earthquakes, occurrence probabilities for earthquakes of different accelerations, connections between seism and tectonics, and the delineation of zones for various anticipated magnitudes. This research was summarized in two volumes, under the title "Studies of Seismic Risk and Zoning."

The main goal of the program's research has naturally been the drawing of "Maps of Seismic Risk and Zoning," which are the basic element in designing and building earthquake-proof constructions. These two types of maps (those of maximum intensity anticipated for recurrence periods of 50, 100, 200, and 500 years; and seismic risk maps) provide an overall picture of the seismic risk in the Balkans, a region which experiences the production of about 75 percent of European earthquakes.

The studies undertaken as part of the program have shown that during the last five centuries, 20 percent of the Balkans has suffered from earthquakes of high intensity which have caused serious damages. During this time the seismographic network of the Balkans grew through the modernization of existing stations, the construction of new stations (their number doubled), and the installation of earthquake-recording equipment (58 modern seismographs, and 22 accelerometers).

Although the program ended, it will be continued in the future in the form of a regional collaboration program. Because the seismic research in the Balkans has been a remarkable one, similar studies are projected for countries located in the seismic zone between the Anatolian Plateau and the Himalayas, as well as for the Andes.

The most active seismic region in Romania is located at the curve of the Carpathian Mountains, with its center in the Vrancea Mountains. Earthquake epicenters in this area are situated at intermediated depths of 60 to 200 km.

#### Strong Concern Shown in Romania

Romanian specialists are conducting intensive studies to learn about earthquake-producing mechanisms in our country, so that they might be able to perfect a method for determining the geometric, kinematic, and dynamic

parameters of earthquake epicenters, and thereby be able to predict the occurrence of seismic movements. Today, the overwhelming majority of specialists explain the significant temblors (with a magnitude of 7.4) in the Vrancea area in the light of the new tectonic plates theory, even though this theory is not yet fully proven. This problem is also being studied by researchers in Laboratory of Seismometry and Seismology of the Institute for Geology and Geophysics. The tests conducted until now are based on observations of energy buildup as a function of time (by means of Benloff graphs, Wiener filters, seismic cycles, and so on), or on the application of the theory of extreme values, which makes it possible to determine the recurrence period, the probable maximum magnitude, and the risk of temblors. It is thus estimated that an earthquake of the magnitude of the one of 10 November 1940 ( $I_0=IX$ ) could occur in the Vrancea region around the year 2080. This forecast is based on the theory of extreme values and seismic cycles.

At the present time, other institutes in the country are also becoming interested in the manifestations and phenomena which accompany temblors. The Energy Department of CNIT (National Council of Engineers and Technicians) for instance, recently organized a discussion of the work "Energy of Seismic Movements," by Eng I. Sandulescu, during which the author presented his new theory; without entering into its mathematical proofs, this theory is described below.

Exchanges of thermal and mechanical energy as a function of time are taking place between the magma deep within the earth and its surrounding rocks. The magma receives less heat from the central nucleus of the earth, than it gives to the atmosphere. The cooling of the molten mass produces several energy processes in the bulk of its component substances; one of these is the solidification and separation of these substances with formation of gas pockets, that is, a process similar to that by means of which the gases which are diffused in a molten metal form voids in castings during cooling. Each molecule in the magma gases seeks to orient itself in space so as to store a minimum of energy. The effect of the high pressure (tens of thousands of  $\text{dN/cm}^2$ ) and high temperature (above  $1000^\circ\text{C}$ ) at the magma depth, is to place a large number of molecules in an excited state. In their collisions with other molecules, these excited molecules transmit their energy gain. In this molecular chaos, when a mechanical impulse, produced by an underground explosion or by a fracture of the crust, is received from outside the system, some of the excited molecules decompose instantly into the component elements. These components strike with great force the layer with which they remain in contact, and thereby transform the movement of the contact layer into a self-excited mechanical vibration. The mechanical waves produced by these vibrations of the layer which is in contact with the magma, are transmitted to the higher strata until they reach the surface of the earth crust, creating the pre-seismic phase which can be detected by many animals and birds.

The apogee and the self-excited mechanical vibrations are produced at the time at which the entire system of strata in the earth crust move at the rate of the stratum which is in contact with the magma. The decay period occurs when the force of the mechanical impulses (produced by the molecular shock decompositions) no longer can maintain the motion of the entire system of strata in the lithosphere of the respective zone.

On the basis of this theory, the author has designed an instrument for detecting pre-seismic states; this instrument has been patented by OSIM (State Office for Inventions and Trademarks).

Many specialists in our country are making great efforts to prevent earthquakes. The research conducted in recent years has produced for the first time a seismic zoning and risk assignment for Romania. The results obtained by this study were taken into consideration in formulating the standard project of providing a seismic zoning of Romania.

In order to reach the final goal of seismological research -- the forecast of earthquakes -- outstanding efforts are needed both nationally and internationally to use all the methods available in the arsenal of seismology (geodesic study of faults, variations in local magnetic fields and soil electricity, variations in sea and underground water levels, ground tilting, variations in the speed of seismic waves, behavior of animals, and so on). In our country, the Vrancea zone offers unique conditions for studying and organizing a comprehensive geophysic system. The building of the Deva stations, and particularly of the Chela station, equipped with modern instruments and well trained specialists, will make it possible to obtain significant data on earthquakes, thereby contributing to the general effort for earthquake forecasts.

CSO: 2702

BULGARIA

# SUGGESTOPEDIC EDUCATIONAL SYSTEM APPLIED IN EXPERIMENTAL SCHOOLS

Sofia PROBLEMI NA KOMUNISTICHESKOTO VUZPITANIE in Bulgarian No 12, 1976  
pp 31-40

[Article by Senior Scientific Associate Georgi Lozanov, doctor of medical sciences, director of the Scientific Research Institute of Suggestology: "The Suggestopedic Educational System in Experimental Schools; Suggestology in Aid of the Training-Education Process"]

[Text] The main task of educational in the seventh five-year plan is the completion, in its essential lines, of the transition to universal secondary education for all young people on the basis of qualitative changes in the content and organization of the training-education process. One of the emphasis will be the organic blend of training and education with productive labor. As stipulated in the BCP Central Committee Theses, the overall pedagogical activity involving children and adolescents should be organized on this basis, insuring the development of the talents and capabilities and the intellectual, moral-political, aesthetic, physical, and vocational training of the young people for active labor and social work.

These tasks are the focal point of the work of the Scientific Research Institute of Suggestology.

In one or another of its aspects the suggestopedic educational system has been undergoing experimentation for over 20 years. For the past ten years it has been studied at the Scientific Research Institute of Suggestology of the Ministry of Public Education. Experiments have been conducted with various elements of the system and individual methods and suggestopedic training in individual subjects with students of different age groups.

During the 1970/71 school year, by order of the Ministry of Public Education, a one-year experiment was conducted with students of a tenth grade in Sofia. All subjects and the overall educational work were formulated on a suggestopedic basis. The training, education, and medical results of this initial overall experiment based on a suggestopedic educational system were presented at the first international symposium on problems of suggestology and published. Starting with the 1972/73 school year, by order of the Ministry of Public Education, an overall suggestopedic experiment was

organized with the first grade students of school number 122 in Sofia. School number 139 was left as control. Starting with the following 1973/74 school year the experiment was expanded by ministry order to cover a rural school near Sofia, at Dragalevtzi Village, starting again with the first grades. The school in Simeonovo Village was the control school.

The results achieved during that time were reviewed repeatedly by the scientific council of the institute and reported to the BCP Central Committee, and the Ministry of Public Education, and published. A number of commissions studied the results and confirmed the institute's data. This made possible to extend the experiment over a broader territory throughout the country with a view to the possibility to use the suggestopedic system on a country-wide basis.

By order of the management of the Ministry of Public Education, in the 1975/76 school year the experiment covered schools in the following areas: Plovdiv and Dolni Voden Village, Khaskovo, Dimitrovgrad, Blagoevgrad, Pleven, Mikhaylovgrad and Murchevo Village, as well as three schools in Sofia, totalling 1,500 children. The Ministry of Public Education named the following schools as control: Sofia--grammar schools 119, 139, and 64; Plovdiv--the grammar school in Kuklen and the Yordan Yovkov school; Khaskovo--the Vasil Levski school; Dimitrovgrad--the Lyuben Karavelov school; Pleven--the Khristo Smirnenski school; Mikhaylovgrad--grammar school number 2; and Blagoevgrad--grammar school number 2, totalling 1,300 children.

The suggestopedic educational system is based on psychotherapy in its conscious-suggestive communicative variant. It makes use of many art facilities. It is consistent with the most modern psychological trends, refreshing them with new interpretations and new utilization methods. Suggestopedy creates conditions for the natural development of high motivation in the course of the educational process. With such a system education becomes a pleasure. The mastering of new material on a creative level as well as the educational development of the children take place naturally, imperceptibly, in an informal environment. Communications between teachers and students become more normal and more human, displaying greater understanding on both sides and, in this connection, become far more effective. According to the skill of the teacher and depending on the organization of the educational process combined with the suggestopedic training system, the system could reveal and utilize, to one or another extent, on a high creative level, the potential of the human personality. However, even with insufficient skills or organization of the training process, the final positive results are obvious. All this was noted in the course of the organized mass suggestopedic experiment conducted in the past school year.

As we know, suggestopedy rests on the all-round and profound observance of the unity among the following three basic principles:

The principle of happiness and relaxation in which the requirement of simulated attention concentration is eliminated; there is neither an open

nor concealed emphasis on didactics; there is no psychotraumatic emphasis of the insurmountability of the social suggestive norm caused by the limited possibilities of the child's personality.

The principle of unity between conscious-subconscious processes. This excludes focusing the attention, from the very beginning, on the conscious memorization of meaningless details; the proper significance of the great role of peripheral perceptions, the twin-level approach and emotional stimulus are recognized; the personality of the student is not divided as is the case with the present gradual build up and destruction of stereotypes in the course of the educational process. Thus the student is not deprived of an overall view and no conditions are created for neurotic illnesses caused by the frequent disturbance of stereotypes.

The principle of suggestive interconnection aimed at determining personality reserves. As the result of the application of this principle the pleasure derived from the training process is not self-seeking. This develops even more intensify the social suggestive norm. Thanks to the unity among the three principles the well-trained teacher (like the psychiatrist) develops a new harmony--the desuggestive-suggestive tuning which releases the stimulating tuning, the reserve tuning, and the tuning of the new personality.

These three principles are accomplished through three groups of suggestopedic means; psychological, didactic, and artistic. In turn, these are also applied together. Any gradual separation of the principles and the means leads to pitting some against others and their reciprocal annulment. The requirement of unity both of principles and means is particularly important in the implementation of a highly cultured contemporary training and education process.

The psychological means insure the overall psychological organization of the training process (teacher, environment, textbooks, approach, and others).

The didactic means call for the reworking of the educational content in accordance with suggestopedic principles (global presentation of the material based on general dialectic laws and interrelationships taken to their final creative application within the framework of each didactic unit and the twin-level "non-release of elements").

The artistic means demand various forms of art specifically developed and always included in the training process, ranging from the behavior of the feature to aesthetics in the school and to children's artistic-training operas and shows.

We understand the suggestive aspect not in its clinical or hypnotic meaning, as we have repeatedly emphasized, but in the sense of the communicative importance of art as a desuggestive-suggestive release-stimulating factor. This means that suggestopedy derives its name not from the suppressive methods of influencing the individual but of the overall system of freedom from negative suggestive ideas of difficulties in the training process

acquired in advance. Consequently, suggestopedy is a system for release. It uses as its basic elements the various possibilities of art understood in the broadest possible communicative sense.

This clearly shows that teachers must be basically retrained and that the training process must be carefully restructured. At first glance the principles and means in which the teachers must be retrained and which they must learn seem to conflict with the present development of pedagogy. Taking into consideration the increased effectiveness of suggestopedy, however, we are bound to reach the conclusion that this is a system based on solid scientific foundations. Increased scientificity leads to higher results. The seeming contradiction disappears immediately the moment we refine more accurately the content of the terms. For example, the principle of "unity between the conscious and subconscious" does not conflict with the principle of consciousness even though this might seem to be the case on the surface. This principle broadens the significance of the conscious mainly as an attitude and as a means for mastering all the functions of the human personality. Looking at the conscious as an attitude in fact we abandon the concept that the conscious is merely a guided and interpreted attention as is most frequently the case in practical work.

The past interpretation of the principle of consciousness demands the conscientious mastery of details and the creation of a stereotype. This stereotype must then be destroyed in order to create a new one, at a higher level. Once established, in turn it must be destroyed in order to create the next higher stereotype. The destruction of stereotypes leads to a neurotic attitude according to the experimental data and theoretical concepts of I. P. Pavlov. This is one of the reasons for the neuroticism of students. The hierarchy of education stereotypes, however, has other negative aspects as well such as, for example, narrowing the awareness of the students, eliminating study motivations, losing the general line of the subject studied, and others. The principle of "unity between the conscious and subconscious" eliminates this weak aspect of the present understanding of consciousness, by demanding that training be provided on the level of interpreted integral objects. Such a global level training, however, does not mean a return to the methods of the overall approach--the method of entire words, for example--for with the suggestopedic system the education process is conducted on two levels and the second level includes simultaneously the integral and individual elements. In reality, therefore, suggestopedic education is both dialectical and directed toward mental integrity and its constituent parts.

Thus, the real conscious and creative work takes place on the integral level while on the level of details the structural elements toward which the attention is turned only if necessary, from time to time, are mastered on the secondary level. Within this dialectical unity, thanks to the twin level approach, we avoid the dry didactic gradation and the mind operates on a high mental, motivating and inspiring level.

This global and two-level approach, combined with the psychological means within the behavior of the teacher and the overall integrated utilization of the specific means of the arts create conditions for the fast and direct absorption of knowledge and the development of a new type personality.

A mass experimentation was organized in the 1975/76 school year in the indicated schools, with their corresponding control schools, using suggestopedic principles and means. Even though the period of time was extremely insufficient (the experimental schools were named in May while the school year began on 15 September) we were able to train teachers and educators to reach a level close to that required, and to take all the necessary organizational measures for such a mass initiative. In this respect we enjoyed the full support of all responsible state and public authorities, parents, and teachers.

Large groups of specialists outside the institute and the organizational-method workers of the ministry and the public education departments organized the study of the children in terms of their level of knowledge in the various subjects, health, psycho-physiological characteristics, and level of development. The studies conducted at the beginning and the end of the school year, with a gradual investigation at the end of the first term, were conducted by specialists from the following institutes: Hygiene Center, twelve; Medical Academy--Institute of Neurology, Psychiatry, and Neurol Surgery--eleven; Medical Academy in Pleven--four; Medical Academy in Plovdiv--two; Georgi Dimitrov Higher Finance Institute--three; Bulgarian Union for Physical Culture and Sports--one; Pleven Okrug Psychoneurological Outpatient Clinic--one; Scientific Research Institute of Education--two; Kremikovtsi Metallurgical Combine--one; Sofia City Psychoneurological Outpatient Clinic--one; Academy of Social Sciences and Social Management--one.

The following took part in the investigation and evaluation of control work: 1. Okrug Public Education departments--43; 2. Ministry of Public Education--20; 3. Other extracurricular establishments--14; 4. Scientific Research Institute of Suggestology--17; 5. School principals--5; 6. Teachers--7. All in all, throughout the school year 146 specialists outside the Scientific Research Institute of Suggestology became involved in research and control.

Because of the ease with which the children mastered the expanded curriculum it became possible for the experimental schools to convert to a five-day school week with additional possibilities for increasing the number of hours assigned to the arts and labor training and greater contact with nature. The blending of training with education and aesthetic training on the basis of the work principle created conditions for the rapid growth of harmoniously developed individuals, as well as for the early manifestation of talent. The aesthetic and meaningful presentation of the new material on a highly integrated level immediately triggered a high integral and global response among the students based on the method for presenting the material and the method used for the development of the children. The increased significance and role of the labor-creative and aesthetic principles not only did not replace but, conversely, increased the possibility for mastering the material in all subjects.

The integrated global development of the daily system followed by the children included the participation of specialists from the Central Pioneer Palace, the Central Young Technicians Station, the Central Station of Young Agrobiologists, the Central Sports-Tourism Station, the House of Literature and Arts for Children and Adolescents, and the okrug pioneer houses and stations in the okrugs in which the experiment was conducted.

With their help as well as with the help of the Ministry of Public Education and the public education departments and the principals of experimental schools and the entire faculties we were able to organize the following daily regimen of the children:

8-11:30 am, classes; 11:30-12:30 pm, free games; 12:30-1 pm, lunch; 1-2:30 pm, nap for the six-year old, and active recreation for the seven-year old children; 2:30-3:30 pm, sports; 3:30-4:30 pm, circles by inclination, Russian language, and artistic reading based on a special program.

Commissions approved by the minister of public education participated in defining the curriculum. Here we encountered certain difficulties, for we were forced to take into consideration the ministry's curriculum for the first-third grades. We combined it and lowered materials from the second and third to the first grade. However, in this respect the suggestopedic training system offers considerable possibilities which should be subjected to future experimental studies.

In terms of method, we had the necessary freedom to develop in accordance with our past practical experience and scientific-theoretical views. Within the short time at our disposal we were able to provide a basic skill to teachers and educators involved in the experiment. However, a great deal remains to be done in this respect, for suggestopedy is a question of life-long advancement and self advancement. We must improve the skills of teachers and educators in individual work within a group, improve the efforts to create in the students an even higher self-discipline instead of the traditional coercive form of discipline, improve the experience of teachers and educators in work with lagging and talented students without creating an intra-group conflict, work actively with the parents, and, in general, develop a new suggestopedic approach to all old and new problems facing the school based on contemporary requirements and the extensive possibilities of suggestopedy. Naturally, extensive social work for the creation of a suitable releasing, stimulating, and developing environment for the children under extracurricular conditions will be of particular significance.

Despite all difficulties the final results were particularly encouraging. Without mandatory homework and with a five-day school week, without fatigue or tension, the first-grade students in the experimental schools mastered on a high creative level the entire first-grade material and the almost entire second-grade material and, in some subjects, some of the third-grade material. The results may be seen in the diagrams and tables attached for reading and mathematics (based on the curriculum of the Ministry of Public Education for the first grade) and the second-grade material (curriculum of the NIIS

[Scientific Research Institute of Suggestology]). Similar results were achieved in all other subjects.

The control works of the students in written Bulgarian language (composition and morphological construction) submitted by the students from the experimental and control schools were rated by commissions of Bulgarian language specialists. Control works on mathematics submitted by experimental and control school students were rated by specialists in mathematics.

Control works on labor training, graphic arts, and native geography and history submitted by the experimental and control school students were rated by specialists from the okrug public education departments and school specialists on an anonymous basis.

Control works on singing submitted by students from the experimental and control schools were rated by Ministry of Public Education specialists and specialists from the okrug public education departments.

Individual tests in reading and determining the time for reading an excerpt from a story were conducted by a joint commission of specialists from the Ministry of Public Education, okrug public education departments, and NIIS specialists.

The commissions were approved by the minister of public education.

We must take into consideration that the results of all other studies conducted and summed up namely by non-institute specialists were also favorable. Thus, for example, compared with the control children, the seven-year old children trained in accordance with the suggestopedic system displayed a faster pace of development concerning most physical development and activity indicators; they were not substantially different in terms of other indicators. Data on the physical development and physical activeness of six-year old children in the course of the school year were also favorable. No data were found of an adverse effect of the suggestopedic educational system on the physical development of the children despite the great volume of the material and the speed with which it was mastered.

The study of the overall health condition and physical and mental morbidity indicated that at the end of the school year short neurotic disturbances in the control schools exceeded by 300 per cent those affecting students in the experimental schools. Even six-year old students who show a relatively higher tendency to develop neurotic reactions developed such reactions to a lesser extent compared with seven-year old control school students. The available data prove that despite the increased amount of absorbed information the experimental school students displayed better possibilities for adapting to the school environment and process.

Data from the sociometric study conducted in the experimental and control schools indicated that the experimental schools offer a more favorable psychological microclimate determining the collectivistic molding of the

personality of the student. Unquestionably, this is a result of the effective pedagogical approach to the solution of problems related to the organization of children's collectives.

The structure of interpersonal relations in the experimental schools was different both in terms of quantitative and qualitative indicators. The students in our schools have a better spirit while the number of isolated children in the classrooms is considerably lower than in the control schools.

Assessing the data we must always bear in mind that they covered a huge number of children from different parts of the country. This gives the results a high level of statistical reliability. We must also always bear in mind that such data were obtained not only by institute personnel but by a huge staff of scientific workers, specialists, and organizational workers from many institutes and organizations. This creates a feeling of reliability.

The assessment of the suggestopedic training-educational system should not be based only on the ease with which a large amount of material is mastered on a creative level. It must always be compared with the positive medical results, for even the best school system, unless medically supported, would have no right to exist. However, suggestopedy must be considered also from the viewpoint of its high educational significance. We cannot imagine the possibility of building a new just society without the high conscientiousness and self-discipline of its members.

Following this line of thought let us draw the attention also to the artistic-aesthetic foundation of suggestopedy, for it is fully consistent with V. I. Lenin's thought: "Art is the greatest suggestion." It is precisely such a suggestion which liberates the personality and stimulates and develops it, stemming from the aesthetic foundations of suggestopedy, that is its basis. This includes beauty, a global approach, lack of tension, the pleasure of learning, and the hope that the human personality will develop and engage in infinite self-progress. Thus labor, training, and aesthetics merge in an inseparable unity in the development of man. On the basis of all this the following conclusion could be drawn: from the educational, training, aesthetic, medical, sociopsychological, and economic viewpoints the suggestopedic training system is several hundred per cent more effective and fully applicable in mass practice without particular difficulties concerning the skill of cadres, the elaboration of a set of training and educational measures, and administrative-organizational restructuring. Consequently, the logical conclusion is to consider the possibility for converting within the shortest possible time to the use of this system in our mass training-educational practice.

# Effectiveness of the Suggestopedic Educational System

## First Grade--Reading Based on the Current Ministry of Public Education Program

(Фиг. 1)

(Figure 1)

Училище (1)	Възраст (2)	Резултат (3)	Бр. седмици (4)	Бр. часове (5)
(6) Експериментално	7 г.	93,5% усвоен материал за първи и втори кл. — МНП	27	99
(7) Експериментално	6 г.	89,6% усвоен материал за първи и втори кл. — МНП	27	99
(8) Контролно	7 г.	79,5% усвоен материал само за първи клас — МНП	31	210

Key: 1. School; 2. Age; 3. Result; 4. Number of Weeks; 5. Number of hours; 6. Experimental; 7. Experimental; 8. Control; 9. 93.5 per cent mastered first and second grade material--Ministry of Public Education; 10. 89.6 per cent mastered first and second grade material--Ministry of Public Education; 11. 79.5 per cent mastered first grade material only--Ministry of Public Education.

In 99 hours the experimental school students mastered a material for which 334 hours are allocated in the mass schools (210 in first grade and 124 in second grade).

## First Grade--Mathematics Based on Ministry of Public Education Program

(Figure 2)

(Фиг. 2)

Училище (1)	Възраст (2)	Резултат (3)	Бр. седмици (4)	Бр. часове (5)
(6) Експериментално	7 г.	83,3% усвоен материал за първи клас — МНП	27	100
(7) Експериментално	6 г.	77,3% усвоен материал за първи клас — МНП	27	100
(8) Контролно	7 г.	63,3% усвоен материал за първи клас — МНП	31	155

Key: 1. School; 2. Age; 3. Result; 4. Number of Weeks; 5. Number of hours; 6. Experimental; 7. Experimental; 8. Control; 9. 83.3 per cent first grade material mastered--Ministry of Public Education; 10. 77.3 per cent first grade material mastered--Ministry

of Public Education; 11. 63.3 per cent first grade material mastered--Ministry of Public Education.

First Grade--Mathematics Based on a Program Developed by the NIIS

(Фиг. 3) (Figure 3)

Училище (1)	Възраст (2)	Резултат (3)	Бр. седмици (4)	Бр. часове (5)
(6) Експериментално	7 г.	83,6% усвоен материал за първи клас — НИИС	27	100
(7) Експериментално	6 г.	78,5% усвоен материал за първи клас — НИИС	27	100
(8) Контролно за втори клас	8 г.	66,4% усвоен материал за втори клас — МНП	31	289
				(155+134=289)

Key: 1. School; 2. Age; 3. Result; 4. Number of Weeks; 5. Number of hours; 6. Experimental; 7. Experimental; 8. Control for second grade; 9. 83.6 per cent first grade material mastered--NIIS; 10. 78.5 per cent first grade material mastered--NIIS; 11. 66.4 per cent second grade material mastered--Ministry of Public Education.

Remark: In the first grade of the experimental schools, in 27 weeks and a total of 100 hours the material based on the Ministry of Public Education program for the first grade of mass schools was studied, according to a program formulated by the NIIS, covering the material for the first and second grades of the mass schools.

The control classes were first and second grade in which the material stipulated only for the first grade of the experimental classes was studied.

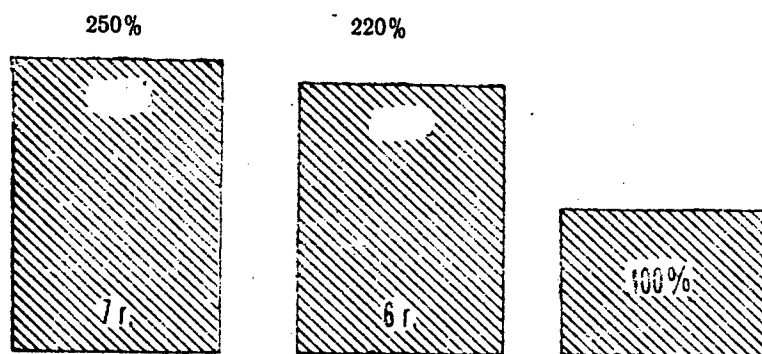


Figure 1

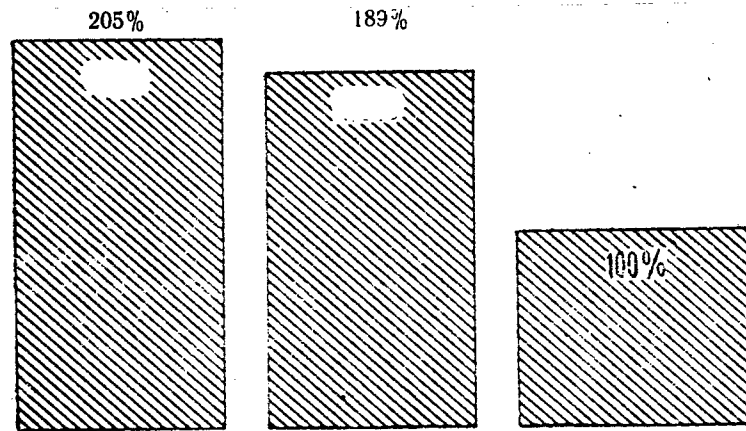


Figure 2

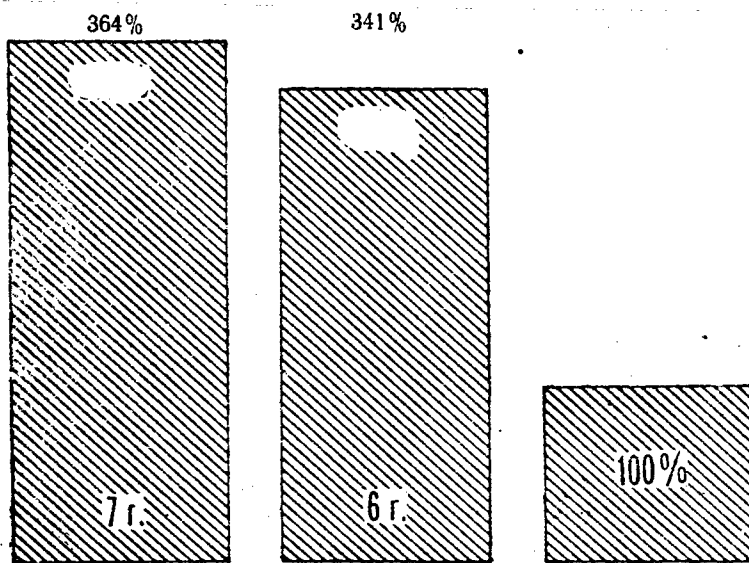


Figure 3

5003  
CSO: 2202

PSYCHOPHYSIOLOGICAL ASPECTS OF SUGGESTOPEDIC EDUCATIONAL SYSTEM

Sofia PROBLEMI NA KOMUNISTICHESTOTO VUZPITANIE in Bulgarian No 12, 1976  
pp 41-45

[Article by Candidate of Medical Sciences Petur Balevski, senior scientific associate at the Scientific Research Institute of Suggestology: "Psychophysiological Aspects of the Suggestopedic Educational System"]

[Text] Modern civilization is characterized by a qualitatively new leap in the development of science and technology. Human labor is acquiring to an ever greater extent the nature of mental labor. This circumstance raises sharply the question of increasing the mental capacity of man and upgrading his intellectual qualities. Pedagogy is faced with the dilemma of how to make the students master knowledge whose volume and complexity are increasing steadily and will continue to increase at a faster pace without leading to over tiredness and nervous and mental illness. Numerous studies conducted in our country and abroad have revealed that with the present level of the school load over tiredness, neuroses, higher blood pressure, and other functional disturbances are not an infrequent phenomenon and are even showing a growing trend. According to medical and psychological studies conducted in our country overload phenomena have been noted in 15 to 20 per cent of younger age students and 20 to 35 per cent of the students in the higher age groups. The highest figures were those in the foreign language high schools and some technical schools. Usually, the most intelligent and ambitious children become overloaded. It is as though an insoluble contradiction develops between the requirements of the public health authorities of lowering the school load carried by the students and the need to master a material ever growing in volume and complexity.

The ideal of the socialist society is not the one-sided developed or neurotic intellectual but the all-round harmoniously developed personality. Consequently, the solution should be sought in discovering human reserves. Such possibilities exist. History has shown that whenever social development has presented a given problem to be resolved proper scientific discoveries have been made and the necessary solution has been found. The current crisis in pedagogy could also be surmounted, for a number of data prove that the possibilities of the human brain are far greater than those so far used.

All this may be reduced to the question of what are these reserves and how could they be utilized through a specific educational system. This question faces not only our pedagogy but education on a world-wide scale. The choice of a pedagogical system which would be most suitable not only for the present but for future requirements is one of capital importance whose significance far exceeds the framework of pedagogy and which could play a decisive role in the competition between the social systems.

An optimal pedagogical system in the socialist society would be distinguished by the fact that it provides an accelerated pace of teaching and creative mastery of a large volume of information without adverse consequences related to health and ability to work. At the same time, it would train harmoniously developed individuals with high communist ethics. Changes in the curriculum or the use of new technical training facilities would be insufficient if we are to achieve this objective. We need a new, a global method which would bring to light and utilize the reserve possibilities of the overall personality. Currently, the most promising in this respect is the suggestopedic training system developed by Doctor G. Lozanov.

The use of the suggestopedic educational system so far has indicated that it reduces considerably the time needed for the study of foreign languages without endangering the health of the students. We have noted even a favorable mental healing effect on individuals suffering from neuroses. Similar favorable results have been noted in the case of students following the suggestopedic educational system in all subjects. It turned out, for example, that in the primary course the materials for the first and second grades could be covered within a single school year without any adverse effect on the children's health. The same results are obtained with students who enter the first grade at the age of six.

The educational effect of the suggestopedic system is no less important. Thanks to the psychological and psychotherapeutic training of the teachers a psychological climate of reciprocal trust and respect is created in which experiences which traumatize the mentality of the students are eliminated. In addition to psychological means, the atmosphere of happiness and relaxation in the classroom is maintained by artistic means as well. Steady contact with various forms of art--music, theater, recitals, and others--in which the children participate personally and which do not constitute separate school subjects but are blended with the curriculum upgrades, on the one hand, the aesthetic and general culture of the students and, on the other, improves and humanizes relations with the collective. Also very important is the feeling of satisfaction experienced by the children when they see through practical experience that they are able to master a large volume of material without boredom and over tiredness, and without homework which is not required in the suggestopedic educational system. Unquestionably, this is helped by the didactic means of suggestopedy such as the combination of educational units, preparation of overall topics, elimination of boring repetitions, and others.

As emphasized by Doctor G. Lozanov, suggestopedy is based on three main principles: the principle of happiness and relaxation, the principle of unity between the conscious and subconscious, and the principle of suggestive interconnection. Each of these principles is based on the achievements in the fields of psychotherapy, psychology, pedagogy, and physiology of higher nervous activities.

The most characteristic feature of the suggestopedic educational system is the global approach adopted toward the individual. As we know, the student is not only a object of influence but a subject as well who displays an active evaluating attitude toward the teacher, the training process, and the presented information. The latest achievements in the fields of psychology and psychophysiology related to the theory of the attitude, the activeness, and reverse action afferent and acceptor, the theory of conditions, and others confirm the non-mirror nature of reflection. The brain does not passively accept the impact of the outside world. The external factors exert their influence in accordance with internal conditions. For this reason the effectiveness of the educational process does not depend only on the characteristics of the presented information but also on the readiness to accept it. The high effectiveness of the suggestopedic educational system is due precisely to the development of a suggestive readiness which contributes to the discovery of the reserve potential of the human mind, usually hindered by social norms and the one-sided approach to the individual.

The principle of happiness and relaxation is related to the study of the mechanisms of appearance of emotions and the role of positive emotions in the educational process. A one-sided rationalistic approach to the mind and scorn for its emotional side have an adverse effect on training-educational work. Positive emotions are a powerful factor in discovering the reserve possibilities of the personality. As was stressed by P. V. Simonov, a well-known specialist in the field of emotions, the emotional condition which arises under the influence of the motivational system energizes the superior parts of the brain in the course of which a conditional tie becomes possible even if information is presented only once. It has been proved that if there is interest the orientational reaction disappears with difficulty even if the excitement is rather weak. We have also known for quite some time that the most strongly remembered are events related to emotional happenstances. This phenomenon was given a physiological explanation only in recent years, after it was determined that brain formations and systems related to the appearance of emotions, readiness, interest, motivations, and expectations play a substantial role in memorizing information.

Relaxation is physiologically substantiated by electroencephalographic studies of over 300 individuals whose brain bioelectric activities during the educational process were recorded and studied. It turned out that the material is best assimilated not by individuals whose brain activities were most excited but by individuals with increased alpha waves (an expression

of mental relaxation) and teta waves (an expression of emotional sensations). These data indicate that what is important in the educational process is not a tense generalized attention related to the reticular formation which excites the entire cortex of the brain. Such attention is related to the expenditure of a great deal of nervous energy and cannot be maintained over a long period of time. Selective attention related to the frontal areas of the brain and the subcortical limbic system is far more effective. In selective attention the brain is not flooded by a broad excitation process. Excitation centers develop surrounded by retention processes in the course of which far less energy is expended. That is precisely one of the reasons for the slow advent of fatigue or, in general, for the lack of fatigue in the suggestopedic educational process. Selective attention and a condition of mental relaxation are aided and supported by art--calming music, intonation, rhythm, and the pleasant unstressed psychological atmosphere free creativity.

The principle of the unity between the conscious and the subconscious is based on the fact that the conscious is only part of the mind. The mind includes not only conscious but subconscious processes. Mental activities are related not only to the cortex of the brain but the subcortical mechanisms as well which are linked with the cortex through ascending and descending nerve links. Until recently it was believed that a conditioned reflex can be formed only in the brain cortex. New studies have proved that the conditioned reflex is a complex system of ties both in the cortex as well as the subcortical areas. Since a conditioned reflex involves the participation of a great variety of brain levels and formations, in the course of the educational process we should use the means which energize not only the cortex but the subcortical area as well. The energizing role of the subcortical area on the cortex was stressed by I. P. Pavlov himself. However, new research in the field of psychophysiology concretized the functions of the various subcortical formations included in systems guided by the cortex which play an important role in shaping readiness, motives, emotions, memorization, and so on, as we mentioned.

As Doctor G. Lozanov has emphasized, the use not only of conscious but of subconscious forms of information is the basis for the discovery of reserve possibilities in the personality. The subconscious should not be linked only with the activities of the subcortical area. Subconscious aspects exist in conscious activities as well. Even the most logical and best motivated speech contains automated subconscious aspects. New data on the functions of the right half of the brain proved that it too is related to subconscious excitation. The functions of the two brain hemispheres are quite different. Even though it is not a question of 100 per cent specialization, the left hemisphere in man is related mainly to abstract thinking and computing operations, while the right hemisphere responds to specific-graphic thinking, space orientation, and musical and artistic perceptions and abilities. There is also data that the right hemisphere is responsible for the perception and processing of subthreshold and peripheral excitations. It is aware of changes in mimicry, voice intonation, pose, and gestures--in general, of the elements which accompany the logical expression of thoughts. Such peripheral excitations have their impact even though it

is not always realized. The organization of the conscious and subconscious interrelationships in the educational process within a single communicative system is the basis of the third principle in suggestopedy--suggestive interrelationships. The use of the two-level system is one of the basic methods of the suggestopedic educational system.

The fact that in the suggestopedic educational system we do not rely only on the alternation in loading the cortex or the subcortex or the one or the other hemisphere is of great importance to the psychohygienic effect of the suggestopedic system. An example of this is a class in mathematics followed by singing for unloading purposes. It is not necessary to tire the cortex of the left hemisphere and then, by energizing the subcortex and right hemisphere to restore its ability to function. In order to maintain high mental ability to work we must influence simultaneously all brain formations. To this effect the inclusion of elements of art in each class hour is of substantial significance.

5003

CSO: 2202

PSYCHOHYGIENIC ASPECTS OF TEACHER-STUDENT SYSTEM

Sofia PROBLEMI NA KOMUNISTICHESKOTO VUZPITANIE in Bulgarian No 12, 1976  
pp 46-49

[Article by Senior Scientific Associate Doctor Dimitrina Kolarova, Scientific Research Institute of Suggestology: "The Psychohygienic Aspect of the Teacher-Student System"]

[Text] In recent decades medical science has gathered and considered some interesting facts on the significance of the microclimate of the family and its interpersonal relations in terms of the proper development of the character of the children raised within it. Regardless of some biologizing and psychoanalytical trends in the interpretation of such data it appeared that the reactions of the future citizen are largely modeled by the extent and the form of the love he receives in his nursing early childhood period (mainly from the mother) and the authoritative model (mainly of the father) in the periods of early childhood and pre-school age. In the case of an undamaged child, whether genetically or in the womb, the authority and love of the parents are the first necessary prerequisites for the building of the future harmonious personality. Bulgarian authors such as Khr. Dimitrov, M. Achkova, N. Dashinova, Khr. Khristozov, and others emphasize that the need for an authority, an ideal in which to believe and on which to lean and emulate is a "vitally important need" of the child. From the viewpoint of suggestology the authority of the parents is the suggestive means through which they influence the attitude of the child toward the people and the world in one or another direction.

The proper development of the child's personality by the time it begins school requires more than the mother's love and the father's authority stemming from love. Leaving the family circle and entering school, the child seeks a new model to emulate. The attitude toward the teacher has been prepared by the attitude toward the father to the extent to which it represents an active experience which is not gained "unconditionally" but must be "earned" and "paid for."

According to E. Fromm the "ideal" of mental health is achieved by blending two related human adjustments--love for and trust in others, based on mother's love, and social ties, the happiness of a free choice, and the

assessment and guidance of one's own behavior, based on the father's love. Under contemporary conditions we believe that during early childhood and school age the teacher is the one who expends and combines these inter-relationships. However leading the influence of the family may be, it has more limited opportunities to exercise an influence compared with children's institutions and the school in building up the mental health of the young generation.

The prestige of the teacher in the first grade is developed also through suggestion, as a "phenomenon of daily interpersonality relations" (G. Lozanov). As a factor of a nonspecific mental reaction, with the suggestopedic educational process it is not formed by the shout, the shriek, the rod, the paralyzing powerful depression exerted by the adult, the big person, who separates himself from, frightens, and paralyzes the child. The prestige of the teacher in the suggestopedic educational process is the prestige of someone who is loved, who can, who knows, who is pleasant, who organizes, who guides the manifestation of the class, and who sees to it that within the collective every individual may find his specific form of manifestation and reach his maximal development. Only an individual well familiar with the ways and means of the conscious and subconscious impact on the mentality of the child and who tries to be an ideal human being, combining all beautiful human qualities (morality, intelligence, strength, beauty, and so on), a personality without weakness and faults could inspire the admiration and desire to emulate which could be mastered and integrated within the personality of the child, influencing his attitude toward the people and the world as he strives toward an individual ready to master socialist morality and become the builder of a socialist society. "The teacher says," or "our teacher knows best," or "our teacher is the most beautiful," are idealized models necessary for the proper development of the training and education process in the first grades, indicating that within the teacher-student system the necessary optimal atmosphere has been developed with the maximal utilization of the means of suggestion in practical work. Love is an important component in this atmosphere. However, this is a measured love, a stimulating love which neither over encourages nor suppresses. Traditional pedagogy speaks of authority. Suggestopedy, however, considers authority a form of suggestion in a state of inseparable unity with motivation and affectivity.

Only a physician who has mastered the ways and means of subconsciously influencing the patient could become a psychotherapist. Deliberately using the possibilities of the speech, paralinguistic communications (gestures, mimics, behavior) and art in this direction, without the patient realizing it he can treat some of the patient's illnesses or rebuild his personality. Whenever possible G. Lozanov, the developer of the suggestopedic trend in pedagogy, emphasizes that its origins should be sought in psychotherapy. Developed in antiquity as a treatment for mental diseases and making its way through the centuries, gradually psychotherapy developed as a trend in medicine. Currently, as a universal treatment method, it characterizes the progressive attitude adopted by modern medicine toward man, a science which has never omitted to point out that in addition to being a biological

being man is also a unique individuality, a personality; and that whether sick or healthy, he participates in and reacts to an atomical and physiological as well as mental level. Modern psychotherapy fights for introducing a "style of sterility of speech and behavior" (I. Z. Velvovski), for preventing the medical personnel to exert a morbid influence on patients and healthy individuals they are in touch with and, last but not least, for a style leading to detecting personality reserves in the struggle against the illness.

The desire to humanize the contemporary school led the physician to look at pedagogy. From the psychogenic viewpoint the effectiveness of the teacher-student system operating under the conditions of the suggestopedic educational process may be determined by the influence which this process exerts on the mental health and reaction of its components.

The closer this system is to the theoretical formulations of suggestopedy the greater will be the lack of adverse emotional experiences in the course of the labor and training process, adversely affecting the mental health and reactions of the participants.

In the 1975/76 school year all first grade teachers and students of experimental and control schools throughout the country were observed. Their state of health was observed by a team of specialists. The results of the first summations of such data are already known to our public. The conclusion is that both teachers and students in experimental schools, despite less favorable indicators at the beginning of the school year, and with a higher load in the course of it, showed a trend toward lesser neurotic morbidity and better reactions at the end of the school year.

What were the less favorable indicators at the beginning of the year concerning the teachers? As teachers with long practical experience all of them had an established style of work, based on the classical teaching method, a style which had to be surmounted after a brief training period. Most of the teachers "fell" into the experiment, while individuals selected it and mastered it seeking a new approach. Others joined guided by their communist duty of being in "difficult" sectors or else because they were appointed. Some of them brought to the experiment the feeling of people who have always been successful and the pride of teachers who, at the end of the year, harvest the rich crop of high educational achievements; others, however--the majority--brought their dissatisfaction with achievements and with their evaluation and ratings. There was a common reaction of fear in the face of the new requirements and the volume of the material which had to be taught and mastered by the students. In some teachers the fear of the tasks facing them was replaced by the fear stemming from their responsibility for the health of the children. The belief that the high overload leads to mental troubles was not surmounted.

In the course of the school year, as ties and relations were established, and as the suggestopedic principles, ways, and means were mastered, and as the results became apparent and confirmed, the reaction of the teachers to their work became homogeneous. With rare exceptions innovation, satisfaction

with the work, the feeling of duty and professional responsibility developed immeasurably. There was no absenteeism. Regardless of personal problems or their state of health the teachers faced the students every day, smiling pleasantly. There were even cases in which, ignoring medical orders, and life-threatening illnesses (thrombophlebitis), or else conditions threatening the health of the offspring (difficult pregnancy with painful vomiting) the teachers did not abandon their positions.

The teachers who participated in the experiment unanimously described the school year as "difficult" for them. The need for self improvement and work on lesson preparations brought about mental and physical loads unknown the previous year. Despite this, by the end of the year we noted that their health condition had stabilized.

The fact that the material for the first and, partially, the second grade was mastered in the course of a single school year indicates that the first grade student as well was faced with a higher load. Some such students entered school at the age of six, i.e., without having reached the necessary age-group maturity needed for being trained on the basis of traditional concepts. Surveys conducted at the beginning and the end of the school year indicated that there was a positive response to the school and the teacher and a motivation to learn. However, this attitude was negative in nearly one-half of the children from gypsy origin. Furthermore, these children had no stereotypes even for collective games or for games with adults. The proper functioning of the teacher-student system may be disturbed as a result of a linguistic barrier as well. Despite these prerequisites, by the end of the school year this group of children displayed a positive attitude toward the school which was characteristic of all observed students (V. Milev and S. Stambolova). Furthermore, despite the slightly more frequent cases of neurotic manifestations among these students at the beginning of the school year, in the course of the year the growth of such manifestations was not higher than that of the other students in the experimental schools (M. Achkova).

The results for the teachers and first grade students in experimental schools resemble the facts accumulated in the past ten years dealing with adolescents and adults subjected to suggestopedic influence. The suggestopedic educational process has a favorable influence not only on the healthy individual, for it improved the health condition of 66-72 per cent of those neurotically ill to one or another extent. The favorable effect noted under the high-load circumstances which, according to electrophysiological data does not lead to fatigue could be explained by the prophylactically acting effect of the psychological climate in the school. The proper utilization of the conscious-subconscious mechanisms and the suggestive-desuggestive inter-relationship, colored by love for the child and respect for the dignity of man, are part of the prerequisites for the noted extensive expansion of the possibilities of the students in the course of which they demonstrate not only high achievements in mastering the material but a tendency toward a qualitatively new attitude toward labor, schoolwork, and classmates.

In traditional schools as well there are teachers who love children or teachers enjoying a prestige based on humaneness. In the suggestopedic educational process, however, the new method and ways and means, and the new system for presenting the curriculum makes possible for the work of the teacher to provide an energizing impulse for positive feedback. Fast results, satisfaction with the work, and so on, create this kind of psychological condition of the teacher, favoring schoolwork, protecting him from mental exhaustion and neurotic decompensation, enabling him to develop harmonious relations.

5003

CSO: 2202

SUGGESTOLOGY, MEANS FOR MASS INFORMATION, PROPAGANDA

Sofia PROBLEMI NA KOMUNISTICHESKOTO VUZPITANIE in Bulgarian No 12, 1976  
pp 50-53

[Article by Scientific Associate Doctor Lyubomir Ganovski, Scientific Research Institute of Suggestology: "Suggestology and Mass Information and Propaganda Media"]

[Text] The mass information and propaganda media (SMIP) hold an important position in the structure of social relations. Creating a certain order in the reflective mental activities of man they reduce to a minimum the element of spontaneity inherent in the direct reflection of the facts of reality.

The SMIP implement mass communication processes which include the elements of ideological and political content in their output. That is why in the BCP Central Committee accountability report to the eleventh congress Comrade Todor Zhivkov clearly emphasized that "the press, television, radio, news agencies, and book publishing are the main channel for the dissemination of spiritual values and for mass political influence. They not only inform us of events at home and abroad, and not simply reflect the labor accomplishments of the people, but continually participate in their organization." The reason is that SMIP has become a necessary component of social life, a source of steady information presented as ideas, images, and concepts which supplement and enrich the direct human experience, forming value concepts, and actively influencing the functioning of the human personality. The content of the mass information processes influences the emotions, thoughts, and judgements of the individual and his individual actions and overall activities.

The main psychological methods used by SMIP in submitting the information to the public are persuasion and suggestion. Despite the fact that, as though "traditionally," in practical work conviction is pitted against persuasion, there is a link between them. Since there are different viewpoints and concepts concerning persuasion, let us immediately specify that the concept "persuasion" is given the meaning of the science which studies it--suggestology. According to this science persuasion is considered not in its purely medical sense but as a "form of mental reflection, a universal

phenomenon subject to control." Suggestology considers persuasion in its broad sociopsychological aspect in which "it brings to light theoretically, interprets, and practically utilizes both conscious and a number of subconscious aspects in the overall activities of the individual."

From the viewpoint of the suggestological theory of communications "conscious and subconscious information processes occurring among people are in a state of dialectical unity." Let us clearly emphasize, however, that suggestology has nothing in common with the use of a "suggestive pressure" on the individual or the uncritical promotion of deliberate misleading or "manipulation with the mind." Such is the very tendentious or uneducated view of suggestion displayed by some people. Such people may bear in mind the concepts of bourgeois science and ideology from whose arsenal western SMIP draw means for their activities.

Let us discuss briefly the study of the functional purposes of influence exerted by SMIP based on the positions of Marxist social psychology. Such an analysis proves that the purpose of such an influence is to trigger the recipient (the accepting personality) to engage in certain activities oriented toward the values shared by the socialist society, and toward a certain behavior conducted within the limits of the norms elaborated by society and for the sake of achieving class objectives. Whatever the manner or the level of mass communication the influence of the information submitted to the audience aims at triggering within the individual mind associations with specific values consistent with the class outlook. Thus SMIP help to develop in the audience social and class-party criteria, and a value attitude, creating a conceptual-value orientation. On the basis of the knowledge of reality in the process of communications an attitude toward values develops in the mind of the individual. Appealing repeatedly (but without exaggeration) toward such values, such an attitude may gradually strengthen and become a factor which helps the individual to choose one or another variant in his assessment or behavior under specific circumstances. Strengthened by social practice and confirmed by individual experience, such a mental development represents a social concept (adjustment) which is one of the important factors in the activities and behavior of the individual.

Naturally, SMIP do not enjoy the monopoly in the shaping, consolidating, or changing social adjustments. They are developed in the course of the building of the personality and its socialization. This takes place in the course of the educational process, the mastery and gathering of experience needed by the individual for his activities within the group, and his inter-personality relations. The information impact merely supplements and helps this process.

Clearly, man is the target of SMIP and suggestology. They also consider man as an active subject of information processes. Suggestology also takes into consideration social adjustment and the factors which shape, consolidate, and amend it. At the same time, it offers possibilities for the discovery and utilization of existing personality reserves. Thus, in practical terms, suggestology develops a new kind of circumstances--the existence of reserves.

Particularly important both to SMIP and suggestology are perception, attention, memory, thinking, intellect, education, and behavior. It is an essential factor of suggestology that it always takes into consideration the latest achievements in the fields of psychophysiology and sociopsychology of communications. It changes and improves accordingly. An example of this is the creation of the now existing and successfully applied desuggestive-suggestive educational system--suggestopedy--which is a psychohygienic, psychoprophylactic, and psychotherapeutic educational system, and a suggestological trend in education. It is based on the "desuggestive-suggestive communicative psychotherapy linked with the overall acting releasing and stimulating factors in art."

Particularly important both to SMIP and suggestology is the question of the selection, processing, and presentation of information. Both are interested in meeting one of the basic mental needs experienced by the individual at all points in time--"thirst for information." In their case implementing the task of satisfying such human requirements is possible providing that timely, valuable, and emotionally saturated with convincing persuasiveness and logic, impressive information is aimed at the audience. They have a clear reaction to the opposite side as well--delayed information, unconvincing statements, and routine dullness ("grey flow") which leave unaffected the feelings of the audience, creating situations in which one could not hope for any success as a result of a communicative impact.

This is taken into consideration by both suggestology and suggestopedy. They bring to light and study negative suggestive influences on the individual. The process of assimilation of information is facilitated and accelerated through the creation of a favorable psychological atmosphere and a highly humane communicative process; the all-round development of the personality is stimulated and the personality experiences a deep reconstruction. That is how moral problems as well could be resolved successfully.

Both SMIP as well as suggestology and suggestopedy ascribe great importance to the authoritativeness (in the sense of prestige!) of the information source. However, they also consider such authority as a source, as a means for the discovery of reserves.

Suggestology and suggestopedy utilize "a number of components of the emotional aspect of the personality such as motivation, interests, and aspirations." At the same time they ascribe particular importance to the so-called peripheral perceptions through which man can perceive an additional amount of information without loss of mental energy. Furthermore, they study and control the means through which we can harmonize the signals received on the first level of the information impact. In this respect art is the most powerful means. It creates favorable conditions for surmounting anti-suggestive barriers. The various types of art (music, theater, motion pictures, ballet, pantomime, puppetry, and others) contain combined desuggestive-suggestive means whose form is most suitable for the purposes of suggestology and suggestopedy. That is how a number of problems related to aesthetic education are resolved.

Interesting results are provided by the experimental suggestopedic data (foreign languages and schools). As a result of suggestive communications in the course of the educational process friendly relations are established rapidly; a collective with a good socio-mental climate is developed.

Suggestology created a new trend in education--suggestopedy--through which the overall personality becomes involved, making possible the discovery, release, and utilization of personality reserves. That is why suggestopedy is a global communicative educational system whose purpose is not only to improve man's memorization possibilities (which increase several hundred per cent!). At the same time, "it stimulates intellectual activities, upgrading the emotional tone, improving the sociopsychological links, and influencing favorably the personality in general."

But let us go back to SMIP. It has been established that if for a certain period of time the contact between the consciousness of the individual and the output of SMIP is disturbed, the person may develop a feeling of the depressing lack of information concerning events related to the surrounding social environment and the world. Thus the individual will be largely deprived of information material triggering an emotional reaction or value judgements. This is due to the fact that contact with SMIP contributes to the process of self assertion of the individual and to predicting his activities as well as the activities of those around him.

Meanwhile the volume of information will be increasing steadily. The conditions governing human mental activities in the contemporary world are changing objectively. This creates a specific redistribution of the share of information concerning the world entering the mind of the individual as a result of direct contemplation of reality and information supplied by SMIP. Obviously, the trend toward upgrading the information entering the human mind and, particularly, that of the young generation, as a result of SMIP activities will continue in the future. In this connection we should mention that suggestology and suggestopedy resolve very successfully the problem of increasing the volume of useful information mastered within a time unit without stress or fatigue.

In our view SMIP, suggestology, and suggestopedy have many points in common. Obviously, the achievements of suggestology and suggestopedy could be used by SMIP in cases such as:

1. The study of foreign languages (Russian and western) and other types of training;
2. Health education and propaganda;
3. Aesthetic education;
4. For a variety of cognitive, educational, and upbringing purposes.

These are hardly all the "areas" in which suggestology and suggestopedy could be useful to SMIP.

The present article does not provide a solution to problems or a specific answer to important questions. Its purpose is to indicate the possibility for cooperation among SMIP, suggestology, and suggestopedy.

#### BIBLIOGRAPHY

1. "XI Kongres na BKP. Dokladi i Resheniya" [Eleventh BCP Congress. Reports and Decisions]. Partizdat, Sofia, 1976.
2. G. Lozanov, "Suggestologiya" [Suggestology], Nauka i Izkustvo, Sofia, 1971.
3. G. Lozanov, Bulletin SUGESTOLOGIYA I SUGESTOPEDIYA, Nos 1, 2, and 3, 1975.
4. V. N. Kolbanovskiy and Yu. A. Sherkovin, "Problemy Sotsial'noy Psikhologii i Propaganda" [Problems of Social Psychology and Propaganda], Moscow, 1971.
5. Yu. A. Sherkovin, "Psikhologicheskiye Problemy Massovykh Informatsionnykh Protssessov" [Psychological Problems of Mass Information Processes], Izd. Mysl', Moscow, 1973.

5003

CSO: 2202

BULGARIA

EFFECTS OF EXTRACURRICULAR ACTIVITIES ON SOCIOPSYCHOLOGICAL ASPECT OF STUDENTS

Sofia PROBLEMI NA KOMUNISTICHESKOTO VUZPITANIE in Bulgarian No 12 1976 pp 54-60

[Article by Candidate of Pedagogical Sciences Georgi Angushev: "Extra-curricular Activities and Their Reflection on the Sociopsychological Aspect of Students"]

[Text] The eleventh BCP congress determined with Marxist-Leninist perspicacity the main directions of socioeconomic development: building the material and technical base of socialism, and intensifying both the social activeness of the individual as well as his creative participation in labor activities.

The implementation of the new socioeconomic function of the school demands the ever fuller knowledge and mastery of the objective laws, trends, and mechanisms governing the molding of the personality.

The developed system of training-educational work is a combination of socio-educational activities: social, cognitive, labor, aesthetic, and physical activities. This unity also became the basis of the overall organization of the training-education process in the expanded experiment based on the suggestopedic training system.

The sum total of subjective and objective aspects of the suggestopedic training system proves that it is a means for the organization and control of the structure of cognitive processes. Suggestopedy is a particular specific type of pedagogy, an alloy of a number of combined means of pedagogical influence, each of which appeals to the respective level or block of man's psychological self-control.

Thanks to the elimination of some fixed levels of activity control the organization of suggestopedic training makes the sum total of traditional methods known to modern pedagogy such as motivation incentive, gradual training, individualization and differentiation in training, elements of problem and program training, and others substantially more effective.

The overall molding of the personality and the socialization of the individual's awareness constitute a process of mastering social norms and values and the conversion of the thus acquired experience into socially

valuable orientations. This is the general philosophical aspect of one of the vitally important problems of our time, a side which, naturally, has a more specific psychological-pedagogical aspect.

The first grade student is a characteristic social, pedagogical and psychological phenomenon. He has replaced games for studies. He has abandoned his toys and has taken up his notebooks. However, he has forgotten neither games nor toys. In small classes ties with training remain within the framework of interest and persistence; subsequently, they develop into a feeling of duty. However, neither studies nor the family environment but the sensory nature of the student alone links him with the rest of the world.

The implementation of the new socioeconomic function of the school demands the ever fuller knowledge and mastery of the objective laws governing the molding of the personality. The building of a pedagogical system represents a unity of socio-educational activities: social, cognitive, aesthetic, labor, and physical. In the course of the development of the subject some of his activities develop hierarchic relations among them. In most general terms activities are divided into practical (object-sensory) and spiritual (cognitive, value, normative). At the same time, they are in a state of unity and interconnection. That is why it is more accurate to speak of the dominant aspect of the set of activities rather than of any individual activity. The theoretical base of this elaboration stems from the view that social activity is a prerequisite for extracurricular forms of work with the students. The socialization of the mind is inconceivable without the socialization of activities. This viewpoint takes into consideration the content and nature of desired activities as well as the study of the processes which make such activities possible.

The psychological aspect is reduced to the study of the moral and psychological relations and the microclimate of the combined action.

In the first grade the students do not represent as yet a collective. Yet, nor are they an amorphous group based only on age. School and extracurricular activities are a means for educational influence. They change the behavior of the child, and create new and vitally important features in its character. They are the base for surmounting some biases or adjustments. This calls for the study of extracurricular activities and of their impact on the socio-psychological aspect of the students with a view to acquiring a precise idea of the dynamics of inter-personality relations among first graders. The practical application of the results will contribute to the molding of an adequate psychological microclimate within student collectives.

With the help of the Central Pioneer Palace and the okrug pioneer houses the Scientific Research Institute of Suggestology conducted seven types of surveys. The sociometric research data proved that a better psychological microclimate exists in the experimental classrooms. Unquestionably, this is the result of an effective pedagogical approach in the solution of the problems related to the organization of children's collectives. The students in the experimental classrooms were more popular among their fellow

students. This proves the existence of a quantitative and qualitative variety of relations and ties among the elements of a given community. Thus, for example, 15.68 per cent of the students in the experimental schools were given ten or more than ten choices to choose a leader of the group, whereas those of the control schools were given only 2.52 per cent. This difference also proves the existence of greater self-confidence among the students of the experimental schools. This was confirmed also by the fact that in the experimental schools 13.86 per cent of the students were not nominated, compared with 16.80 per cent in the control schools. According to Soviet psychologist A. G. Yentina the unstable level of involvement and appearance of outsiders in the group may be considered an indicator of conflict within the group.<sup>1</sup>

These data coincide with the data of another sociological study conducted by the institute according to which whereas the conflict level in the experimental schools was 23.92 per cent, it was substantially higher in the control schools--40.80 per cent.

The imagination of the children was studied with the help of a survey-game which studied the choice of wishes granted with a "magic wand." We must not forget that children's games are deeply meaningful. Once Bertrand Russell claimed that the theory of multiples is childishly easy compared with children's games...

The investigation we mentioned was a test of the collectivistic and individual trends and their correlation. A personal direction, motivated by the satisfaction of certain needs, predominates among experimental and control school first graders. The first graders in the experimental schools are superior to their peer group in the control schools in terms of socialization and collectivistic trends. This trend is manifested by expressing wishes concerning the grade, comrades, family, and people in general. The students in the experimental schools displayed a 6.35 per cent purposefulness concerning the grade, 5.26 per cent concerning their comrades, 5.67 per cent concerning their families, and 11.82 per cent concerning people in general. The respective data for the control schools were 4.32 per cent, 4.75 per cent, 3.90 per cent, and 9.53 per cent. This proves that the experimental group has a higher level of collectivistic purposefulness and socialization.

We know that each collective has two basic types of relations among members--business and personal. (Some authors name five types of business relations: reciprocal requirements, reciprocal responsibility, comradely cooperation, mutual aid, and competition relations.)<sup>2</sup> There is an opinion in the field of child psychology that the reciprocal requirements of third-grade students deal mainly with studies and behavior in the classroom and that only in the third-fourth grades could we add the norms and regulations related to the social activeness of the students and their social interrelationships.<sup>3</sup>

We conducted a discussion with first graders in experimental and control schools based on three questions: "What are the good actions of your

comrades?," "What are the bad actions of your comrades you dislike?", and "On the occasion of the end of the school year what good thing would you like to accomplish?"

The results indicated that the children are not satisfied with simple answers. Assessing the good and bad actions of their comrades, they applied them either to the realm of their qualities, their actions, or their grades.

The study of the results indicates some specific characteristics in the socio-psychological development of the students in the experimental schools. Whereas the students in such schools emphasize in their answers mainly the qualities of their classroom comrades (63.89 per cent compared with control schools) and put lesser emphasis on behavior (25.63 per cent) and grades (10.48 per cent) in the control schools students based their ratings precisely on the last two parameters--32.61 per cent and 11.59 per cent. An almost identical pattern was noted in assessing the bad actions of their comrades. In this case, however, the rating of the grades in the experimental schools was more active--4.26 per cent--compared with 3.0 per cent in the control schools. This trend was found in other studies as well according to which 98.17 per cent of the experimental school students tried to protect the honor of the grade whereas in the control schools the percentage equalled 82.3 per cent.

These data prove that the experimental school students are more mature in terms of contacts with their fellow students as well as their possibility to assess such contacts from individual or social positions.

Answering the third question--"On the occasion of the end of the school year what good deed would you like to accomplish?" the following differences were noted: 52.67 per cent against 51.14 per cent for the school; 24.28 per cent against 23.08 per cent for the grade; 14.40 per cent against 13.19 per cent for the comrades; and 8.64 per cent compared with 12.59 per cent for ones self.

The experimental school students were also given a questionnaire indicating the two forms of extracurricular work on Saturdays, asking them to list their preferences. True to their sensory nature and their young age, the first graders gave priority to favorite games and toys (18.85 per cent), followed by "a trip to Technical City" (7.77 per cent), and, finally, the collection of medicinal herbs (7.64 per cent). Regardless of preferential differences the most essential feature was the fact that a free Saturday was considered last (7.12 per cent).

Such data proved good level of organization in the implementation of extracurricular measures. This creates a sufficiently stable motivation in the children as is a prerequisite for their socialization. We believe that such a study of the children's preferences could be used as a guideline for a more accurate methodical structuring of extracurricular measures and could indicate certain shortcomings of organizational or pedagogical nature.

The control school students displayed their biggest preference for reading--54.0 per cent; membership in the Chavdarche group--53.75 per cent; celebration of Mother's Day--37.25 per cent, and so on.

Comparing the list of extracurricular measures in the experimental schools compared with control schools, it becomes clear that they are not equal qualitatively, even if we ignore the fact that under the suggestopedic system the school grants a free Saturday every week, thus broadening educational possibilities. Extracurricular measures in experimental schools are richer in content and are aimed more directly to personality of the student, enriching his outlook and offering him possibilities for a fuller, creative manifestation.

The experimental school teachers were asked the following question: "Has the attitude of the circle members changed toward classroom subjects and classwork, and if so how?" All teachers unanimously answered in favor of the positive influence of circles on classroom work--100 per cent. Several subquestions were asked to concretize the influence of extracurricular work. It turned out that according to 30.39 of the teachers circle activities upgraded the knowledge of the students in the respective school subject; 19.61 per cent confirmed that knowledge of several subjects had improved; 32.35 per cent stated that the students had become more active; and 0.98 per cent answered that the students were interested only in matters directly related to circle activities.

Such data indicate, yet once again, that circle forms of children's participation in social labor develop their overall creative possibilities and create certain skills and habits which could easily be transferred to other types of activity; they develop in the children firmness of character, initiative, and the skill to work independently; they optimize the overall mental structure of the student's personality, developing in him a need for socially useful labor and readiness to join in any type of socio-labor activity.

Protecting the richness of the child's imagination and his multiple-level sensory nature, and developing for the young generation the power of the human mind is a difficult yet obtainable task. This splendid objective is not a mere wish but, as the data mentioned here show, has its sensible grounds.

#### FOOTNOTES

1. A. G. Yentina, "Studying the Level of Group Aspirations in a Collective Choice of the Level of Difficulty of the Objective." NOVYYE ISSLEDOVANIYA V PSIKHOLOGII, No 2, 1973.

2. A. A. Rusalina, "Vliyaniye Vzaimootnosheniy Mezhdru Masterami Uchashchimisya na Formirovaniye Uchebnoy Gruppy Professionalno-Tekhnicheskogo Uchilishcha" [Influence of Relations Among Instructors on the Formation of a School Group in a Vocational-Technical School]. Moscow, 1968, pp 29-33.

3. L. I. Bozhovich, "Lichnost' i Ee Formirovaniye v Detskom Vozraste"  
[The Personality and Its Shaping in Childhood]. Prosveshcheniye, Moscow,  
1968, p 289.

5003

CSO: 2202

## EAST GERMANY

### NEW MICROCOMPUTERS FROM ROBOTRON DESCRIBED

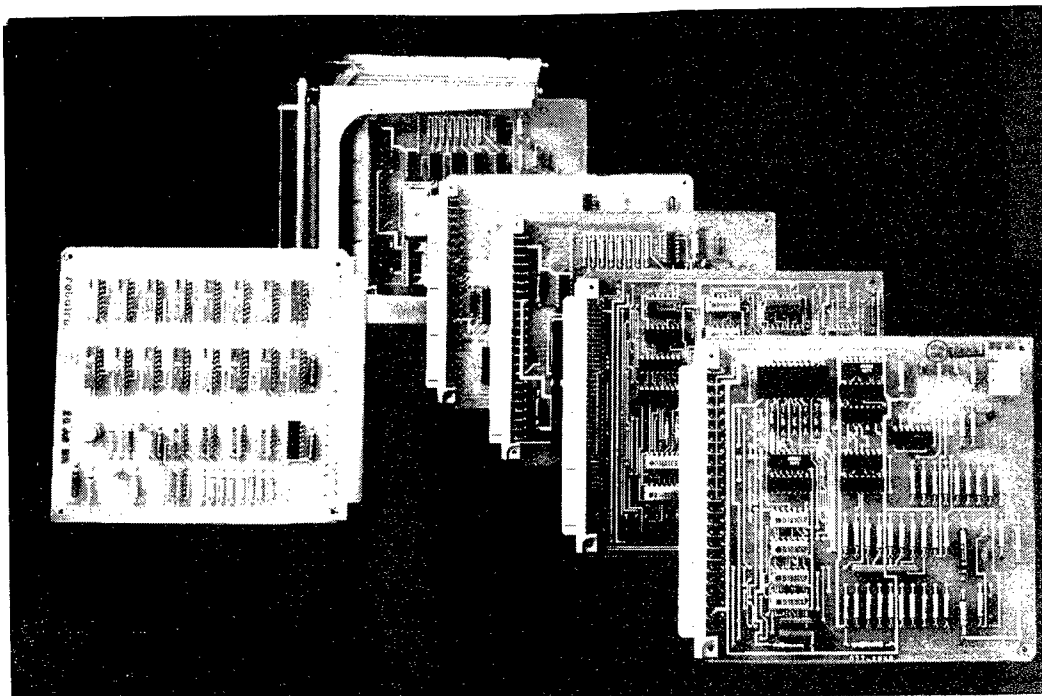
East Berlin DIE TECHNIK in German No 3, March 77 pp 132-133

/Article by E. Hofmann, engineer/

/Text/ The following microprocess-oriented subassemblies and devices belong among the recent developments from the VEB Combine Robotron:

- Microcomputer Robotron ZE 1 (Figure 1)
- Microcomputer System Robotron K 1510
- Programmable Microcomputer Robotron K 1001 (Figure 2)
- Programmable Display Terminal PBT 4000 (Figure 3).

Figure 1



Besides being used in medium data technology, text processing, and EDP peripheral equipment, the automatic control of devices and systems belongs among the selected applications areas for the utilization of microcomputer

technology. These devices and systems are associated with communications technology, machine construction, traffic, medicine and biology, as well as the control of industrial processes. Besides the advantages of small space and minimum power consumption, the microprocess-oriented subassemblies provide individual and cost-favorable adaptation to configuration requirements with respect to storage capacity and terminal controls for selected peripheral devices. The microcomputer Robotron ZE 1 has a processing width of 8 bits, is designed for continuous operation and intermittent operation, and consists of various modules:

- Logic module
- Read-only memory module
- Read/write memory module
- Direct memory channel.

The core of the logic of the Robotron ZE 1 is the central processing unit, the ZVE circuit U 808.

The ZVE circuit U 808 represents a one-chip processing unit on an MOS/LSI basis. Data communication is effected through a special 8-bit data and address bus. Control information, address bus, and processing data are time-multiplexed, and are exchanged between the ZVE circuit and the other electronic components of the Robotron ZE 1. The ZVE circuit itself contains the following essential elements:

- Command register with control mechanism
- Internal storage
- Arithmetic logic unit
- Input/output buffers.

A matching circuit is inserted as a coupling element between the ZVE circuit U 808 and the surrounding TTL logic of the Robotron ZE 1. The function of the matching circuit is to match the low-power TTL compatible outputs of the microprocessor to the remaining TTL circuits. At the same time, this coupling element is used to gather together all the data inputted into the ZVE circuit as well as for switching off the input data during output operations.

The memory of the microcomputer Robotron ZE 1 can be combined from the read-only memory module with PROM/ROM circuits and read/write memory modules with RAM circuits. The read-only memory module is designed for a storage capacity of maximum 2 K bytes. Each memory circuit here realizes a storage capacity of 256 words, at 8 bits each. While the read-only memory module is housed on a plug-in unit, the 2 K bytes module of the read/write memory - static RAM - consists of four plug-in units. Each plug-in unit contains switching circuits for one storage capacity of 512 bytes maximum, whereby each memory switching circuit by itself has a storage capacity of 256 words with 1 bit each.

Processing width	1 byte parallel
Word length	1 byte data
	1, 2, 3 byte statements
Number of statements	48
Types of addressing	Absolute, indirect, indexed
Control principle	Hardware-implemented
Number of registers	1 accumulator
	6 data registers, 8 bits each
	8 address registers, 14 bits each
Operation times	22.5...49.5/us
Maximum storage capacity	12 k bytes, directly addressable, of these 8 k bytes PROM/ROM
	4 bytes RAM
Programmed channel	8 input channels and 24 output channels, each 8 bits, with maximum 15 k bytes/sec
Direct storage channel	1 input-output connection
as optional equipment with maximum	50 K bytes/sec

ZVE circuits and microcomputers are also used with the new programmable microcomputer Robotron K 1001 and the programmable display terminal PBT 4000.

#### Programmable Microcomputer Robotron K 1001

This computer was designed for many technical computer problems in the scientific-technical area, in research and development, and in industry. It uses customary mathematical formulations, and consequently makes it easy for the operator to perform the required computer operations reliably, without using a programming language.

A ZVE circuit is used to control the Robotron K 1001. Like the working storage - RAM - and the microprogramming storage - ROM -, this ZVE circuit consists of MOS-LSI circuits. The working storage is used as program and data storage. A special advantage is the fact that the boundary between these storage regions can be freely chosen by the operator. In this way, the storage capacity can be individually adapted to the applications areas.

In its basic design, a working storage is available with a data region of 10 registers and 3 stack storage registers with 8 bytes each, as well as a programming region for 96 program steps. For automatic input and output of programs and data, a subassembly is available for the reading and recording of magnetic ledger cards. Even when the working storage is maximally extended, the total storage content can be recorded on magnetic ledger cards within a few seconds, or can again be read in from

them. Once programs have been worked out and tested, they can be filed and used arbitrarily often, without repeating manual input.

#### PBT 4000 - Freely Programmable Display Terminal

The PBT 4000 uses a microcomputer as a control core. It distinguishes itself as a powerful working place for communication with the most varied processes as well as with process- and minicomputers. It consists of several configurable components and serves for decentralized, process-near data acquisition, data compression, and data processing. Its free programmability, with quick adaptation to varied applications areas, here provides a special advantage. The PBT 4000 is primarily used to solve the following tasks:

- Concentration of measured data and control outputs in technical measurement and test processes, in production and in laboratories
- Monitoring and control of industrial machines and devices
- Process communication in combination with a process computer
- Control of individual devices of scientific-technical device construction
- Monitoring and keeping inventory of decentralized depots
- Teaching and learning systems in universities, colleges, and other educational facilities
- Information and accounting systems for traffic purposes.

The PBT 4000 can work as an independent system in off-line operation, or it can be coupled with a master computer. A microcomputer is inserted as a control unit in the PBT 4000. As its main element, this microcomputer contains the ZVE circuit U 808 and semiconductor storage circuits. The alphanumeric display unit assures user-compatible operating comfort by means of the selected image and character size and by means of the associated good readability of the display text, even from larger distances. Its constructive design as a desk-top device also collaborates in its user compatibility. The alphanumeric keyboard is designed for inputting Latin or cyrillic capital letters, numbers, punctuation marks, or special characters. By means of the available device-specific terminal controls, the presuppositions are given for coupling to master computers or peripheral devices, such as 5-channel remote writers, serial printers, paper tape readers and punchers, magnetic tape cassette devices.

## Electronic Data Processing System EC 1040 (Figure 4)

The central unit Robotron EC 2640 has been developed and has been produced since 1973 in the VEB Combine Robotron. It has an operating speed of 380,000 op/sec, and it represents the main contribution of the GDR to ESER (Uniform Electronic Data Processing System). Coupled to various peripheral devices of ESER, it represents the EC 1040 EDP system.

Model EC 1040 is a genuine multi-purpose system of the upper performance class. It meets the requirements of commercial as well as of scientific applications areas, the conditions of remote data processing, and can be used as master computer in hierarchical systems.

Besides the interrogation unit and the paper tape station, various types of punched card devices belong among its peripheral equipment. Powerful magnetic tape memories with various parameters permit digital information to be recorded and large quantities of data to be stored. They are especially used as input and output devices for batch processing. Interchangeable disk storage units serve to store and reproduce information in the direct access mode.

The parallel printer EC 7033 is available to output information in printed form. It has a printing output of 600 to 1100 lines per minute, with 128 to 160 print positions per line.

The microfilm output device EC 7602 significantly supplements the peripheral equipment for data processing. It opens up further technical applications opportunities. It is a device for rapidly recording and outputting, in analog form and directly on microfilm, the information stored in electronic computer systems.

The Robotron Combine has furnished the multiplex control device EC 8404, as a contribution to implement remote data processing within ESER. This device represents a modified equipment variant of the minicomputer Robotron 4201.

In the area of programming technique, the disk operating system DOS/ES is available to domestic and foreign users of the EC 1040. Furthermore, various components of the OS/ES operating system are used. This operating system was developed under the leadership of the USSR.

In furnishing the electronic data processing system EC 1040, the VEB Combine Robotron simultaneously made available ideas for its utilization and solutions of tasks from the most varied applications areas. This considerably reduces the user's labor in developing his own projects.

8348  
CSO:2302

## HUNGARY

### USE OF AND DEMAND FOR MICROPROCESSORS ANALYZED, COMMENT ON MICROPROCESSORS

Budapest HIRADASTECHNIKA in Hungarian No 1, Jan 77 pp 1-13

[Article by Dr M. Kovacs and J. Saufert, and comments by Dr Gyula Tofalvi]

[Excerpts] Domestic Uses of Microprocessor Families

The LSI circuits and microprocessors play an important role in the development of domestic digital devices, as they do in all world markets (Table 6).

Table 6. Increases in the number of microprocessors used in Hungary

1972	5 units
1973	10 units
1974	50 units
1975	1000 units
1976	1 - 2000 units
1977	Estimated in the order of magnitude of $10^4$

At the present time, 30 domestic institutions started using microprocessors; the manufacture of approximately 120 different microprocessor-based systems is contemplated, primarily in the field of target computers. However, studies are also being carried out about the use of microprocessors in micro-, mini-, and small computers.

Several institutions such as the SZKI [Computer Technology Coordination Institute], KFKI [Central Research Institute of Physics], VT [City Council], HIKI [Research Institute for the Communications Technology Industry], and the EMG [Electrical Measuring Instrument Factory], now operate PROM burning-in units or REEPROM programming capability.

In view of the extraordinarily fast rate of development, the needs for the various types of microprocessors can be forecast in a realistic manner only for the span of two to three years or so. Domestic users presently demand the microprocessor families listed in Table 7 for the solution of their problems. The types under development in the CEMA countries are listed in Table 8.

Table 7  
[Key on next translation page]

µP család típuszám gyártó cég (1)	Technológia (2)	Ciklus idő (3)	Színhossz (4)	Csatlakoztatható tárkapacitás (5)	Hasonló vagy azonos típust fejlesztő Központ (6)	MSZR előzetes javas- lat (7)	Ár (8)	Megjegyzés (9)
6800 MOTOROLA MOSTEK AMERICAN MICROSYSTEM	NMOS	1 µs	8 bites	64 kbyte	BNK	x	4400	Az egyik legkor- szerűbb típus SV (10)
8080 Intel TEXAS ADVANCED DEV. NIPPON ELECTRIC APPLITED SYSTEM	NMOS	2 µs	8 bites	64 kbyte	SZU, NDK	x	2970 Ft	
3000 INTEL SIGNETICS	SBIP	100 µs	2 bites BIT SLICE	512 kbyte	SZU	x		Perspektivikus MP (11)
6701 MON, MEM	BIP	0,9 µs	BIT SLICE	64 kbyte		x		Az INTEL 3000 család tagjaival összeépíthető MP (12)
SBPO 400 TEXAS	I <sup>2</sup> L	100 µs	4 bites BIT SLICE	64 kbyte	SZU	x	1820 Ft	Perspektivikus CC MP (13)
TMS 9900 TEXAS	NMOS	6 µs	16 bites	64 kbyte				Perspektivikus SV (14)
IPM 16 NAT. SEM.	PMOS	3 µs	16 bites	64 kbyte		x		MP, MC
CDP 1802 D CD COSMAC RCA	CMOS	1,25 µs	8 bites	64 kbyte		x	23,5	Perspektivikus igen nagy zavarér- zékenységű (15)
F8 FAIRCHILD	NMOS	2 µs	8 bites			x		CC

$\mu$ P család típus- szám gyártó cég (1)	Technológia (2)	Ciklus idő (3)	Szóhossz (4)	Csatlakoztatható tárkapacitás (5)	Hasonló vagy azonos típust fejlesztő KöszT-ország (6)	MSZR előzetes javas- lat (7)	Ár (8)	Megjegyzés (9)
MC 10800 MOTOROLA	ECL	65 $\mu$ s	4 bites BIT SLICE	64 kbyte	SZU			KI számítógép CPU, MP, CC (16)
8008 INTEL	PMOS	12,5 $\mu$ s	8 bites	64 kbyte	SZU, NDK CSSZSZK BNK	x	2100 Ft	Viszonylag elavult típus (17)
4040 INTEL	NMOS	10,6 $\mu$ s	4 bites	4 kbyte		x	882 Ft	Egyszerű feladatok- ra (18)
SCAMP. NAT. SEM.	PMOS		8 bites	64 kbyte		x	7,5	Egyszerű feladatok- ra CC, SV (19)
6100 Intersil NATIONAL	CMOS		12 bites	4 kbyte		x		SV, CC
MC 6700 MOTOROLA	NMOS							Egyszerű perspekt- tívikus (20)
CP 1611/21/31	NMOS	0,3 $\mu$ s	8 bites	64 kbyte				Mikroszámítógép MP (21)
2650 SIGNETICS	NMOS	4,8 $\mu$ s	8 bites	32 kbyte		x		CC, SV
MK 5065 MOSTEK	PMOS	1 $\mu$ s	8 bites	32 kbyte		x		

A táblázatban a megjegyzés rovat rövidítéseinek jelentése: SV (single Voltage) egy tápfeszültség szükséges a mikroprocesszor működtetéséhez

CC (clock on chip) a mikroprocesszor tokban benne van az óragenerátor is.

MC (multichip) a mikroprocesszor több tokból áll

MP (microprogrammed) mikroprogramozott, ez azt jelenti, hogy a felhasználó saját utasításrendszert készíthet. A miniszámítógépek software kincsét ilyen módon át lehet menteni a mikroprocesszoros rendszerekre.

Megjegyzés: A fenti összeállítás pontossága kb. 80 %-osnak ítéltető, a felhasználási kör, a KGST-országok történő gyártás az ár stb. adat állandó változásban van.

- Key.
- 1 = Microprocessor family, type number, manufacturer
  - 2 = Technology
  - 3 = Cycle time
  - 4 = Word length
  - 5 = Connectable memory capacity
  - 6 = CEMA country developing similar or identical type
  - 7 = Preliminary Minicomputer System proposal
  - 8 = Price
  - 9 = Remark
  - 10 = One of the most modern types
  - 11 = Perspectivistic MP

12 = MP capable of being combined with members of the INTEL 3000 family  
 13 = Perspectivistic CC MP  
 14 = Perspectivistic SV  
 15 = Perspectivistic, highly perturbation-resistant  
 16 = KI computer  
 17 = Relatively obsolete type  
 18 = For relatively simple tasks  
 19 = For simple tasks  
 20 = Simple perspectivistic  
 21 = Microcomputer MP  
 bites = -bit  
 SV = Single-voltage ( a single supply voltage suffices for the operation of the microprocessor)  
 CC = Clock on chip (the clock generator is in the microprocessor capsule)  
 MC = Multi-chip (the microprocessor contains several capsules)  
 MP = Microprogrammed (the user may prepare his own instruction sets. Thus, the software resources of the minicomputers may be transferred to the microprocessor systems)  
 Note: The accuracy of this tabulation is estimated about 80 per-cent; there are always changes in the use area, CEMA-country manufacture, proces, date, and so forth  
 BNK = Bulgaria  
 SZU = Soviet Union  
 NDK = German Democratic Republic  
 CSSZSZK = Czechoslovakia

Table 8. The following memory IC types are being manufactured in the CEMA countries at the present time

Típuszám (1)	Gyártó cég (2)	Tárolás (3)	Technológia (4)	Tárkapacitás (bit) (5)	Gyártást vállaló KGST-ország (6)
1101	INTEL	RAM	PMOS	256	SZU, BNK CSSZSZK
1103	INTEL	RAM	PMOS	1024	NDK, CSSZSZK
2107	INTEL	RAM	MOS	4096	SZU, BNK
2102	INTEL	RAM	PMOS	1024	SZU
AMS 700	ADV, DEV.	RAM	PMOS	1024	SZU, BNK
MK 4006	MOSTEK	RAM	PMOS	1024	SZU, BNK
MK 5260	MOSTEK	RAM	PMOS	1024	SZU
SG 605	AMI	RAM	MOS	4096	BNK
IPC 504	N. S.	RAM	PMOS	256 × 4	BNK
505	N. S.	ROM	MOS	512 × 8	BNK
506	N. S.	ROM	MOS	1024 × 6	BNK
TMS 2500	TEXAS	ROM	MOS	2560	CSSZSZK, NDK
S 8223	SIGN.	PROM	BIP	256	SZU, MNK
1302	INTEL	ROM	BIP	256 × 8	NDK
1702	INTEL	REPROM	BIP	256 × 8	SZU
93410	Fairchild	RAM	BIP	256	SZU
93415	Fairchild	RAM	BIP	1024	SZU

Megjegyzés: Az egyes KGST-országok mikroprocesszor családok fejlesztésére tettek bejelentést, ami a 7. táblázatban szerepel.

Note: The individual CEMA countries reported the development of micro-processor families, as listed in Table 7

Key: 1 = Type number  
2 = Manufacturing company  
3 = Memory  
4 = Technology  
5 = Memory capacity (bits)  
6 = CEMA country performing the manufacture  
SZU = Soviet Union  
BNK = Bulgaria  
NDK = German Democratic Republic  
CSSZSZK = Czechoslovakia  
MNK = Hungary

Comment of Dr Gyula Tofalvi, Deputy President of the MHE [Hungarian Shipping Association], on the Paper of Dr M. Kovacs and J. Saufert: "Microprocessors"

The authors of the paper presented a very valuable lecture in the summer of 1976 at the Scientific Association of Communications Technology about the structure of microprocessors and the econo-technical importance of their use. The paper was followed by a discussion. Many subjects for which the microprocessor concept served merely as a "catalyst" also emerged in the paper and the discussion.

The following points among these subjects are the most important:

- Effect of the development in the field of integrated circuits on our production of electronic devices;
- Changes in the ratio of the electronic component and device manufacturing industries in terms of division of the work, and the change of the cooperation between the two industrial bases into a productive force;
- Development trends evident from the life diagrams of electronic components and their consideration in formulating our goals;
- Effects of the use of highly integrated circuits on the process and organization of product development and manufacture;
- Role and importance of the reliability of the electronic components in the development of our device manufacture;
- Decreasing trend of the theoretical obsolescence of IC manufacturing technologies and conclusions capable of being reached from this;
- Effect of the use of integrated circuits on system design;
- Expected development of the target devices and target computers realized with digital circuits;
- Effect of the general use of computers on universal research and development, and on production;
- Expected changes in the value ratio of hardware and software;
- Need for uniformity and standardization in the electronics industry, and so forth.

From the paper and the discussion on the subject of the structure and econo-technical importance of microprocessors, the most important subject as far as we were concerned was not the effect of the use of the microprocessors themselves but the effect of the use of the LSI circuits on the entirety of our electronic industry.

Search for microprocessor applications goes on by now beyond the sphere of research institutes (since 1975); it now goes on more and more in our enterprises (TRT [Telephone Factory], EMG, VT, MMG [Mechanical Measuring Instrument Factory], IGV [Office Equipment Factory], ML [Mechanical Laboratory], Hir KTSZ [Communications Technology Crafts Cooperative], and so forth). This demonstrates that a new era has started in the development of our electronic industry.

The second most important subject mentioned in the paper and in the discussion was the software problem. The importance and role of the software problem is not that the manufacture of the hardware portion of the microprocessors is unlikely to bring an economic success to our electronic-component industry, nor that the value ratio of the microprocessors tends to shift decisively toward the software direction; it is that the software will be the quality index of a new culture which will spread and will determine our technological and economic standard.

The software problem started with the fact that the growth of the computer technology industry, realized a few years earlier in Hungary, established — independently of the uses of the microprocessors — the need of the national unification, standardization, and coordination of software, and created the need for the application services and industrial production of software. We can solve this problem only in the years to come, once the use of microprocessors will become general.

The problem continues by the fact that before the domestic use of microprocessors has started, the software matter involved the communities qualified in the field of computer-technology application. At the same time, there will be a major change here too as we use microprocessors. If we lack suitable and high-quality software coordination, there will be a proliferation of low-level practicism, heterogeneity, parallelity, and uneconomical solutions. One measure of the cultural level of our work is whether we prevent this from happening or whether we put up with the heterogeneity, parallelity, and uneconomical solutions.

One way to prevent hardware heterogeneity is to establish a type assortment of nationwide scale; one way to prevent software heterogeneity is to establish a broad scale of application type programs, and the development of an application service.

The technical and economic indicators, data, trends, interpolations, and extrapolations presented in the paper and the discussion indicated clearly the need for our major goal in the beginning of the new era: We must review the long-range plans of our electronic component and device manufacturing industry, and we must implement it over the years to come, so that we become adapted to the quickly changing conditions of the new era.

2542

CS0: 2502

END